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Standard Method to Determine Causes of Industrial Accidents

Committee Is Working on "Cause Code" as Basic Step in Studying How Accidents Occur.

Many Accident Report Forms Found To Be Useless.

STATISTICS, although sometimes misleading and inaccurate, are nevertheless indispensable to the efficient conduct of modern business operations. Statistics are most valuable when they relate to the occurrence and prevention of accidents resulting in loss of life and limb.

Progress in accident prevention in the last decade has been substantial, and certain developments have convinced industry that safety is as much an inherent part of industrial routine as production, sales, or personnel work.

The developments referred to have resulted from research which proves:

1. That safety is definitely associated with the volume and efficiency of production and that a high accident frequency spells lowered production and increased operating costs.
2. That the total cost of accidents is several times greater than the aggregate expenditures for claims, medical service, and hospitalization.
3. That the unsafe acts of persons produce more accidents by far than hazardous machines.
4. That the correction of unsafe acts is just as much and just as readily a matter of management and supervision as the correction of improper acts that result in poor work quality and volume.

Facts Are Demanded

Industrial leaders have demanded facts on which to base a more effective attack on accident occurrence. It is no longer as necessary to "sell" safety but it is necessary to provide a suitable *method of procedure*. Dependence can no longer be placed on mass educational generalities, unsupported by pertinent facts. Fault and causes are today recognized as factual material.

History of Accident Cause-Code Revision

Accident cause codes came into prominence and were found to produce extremely limited and also inaccurate and non-valued data, and in 1927 a sub-

committee of the American Standards Association Committee on Standardization of Methods of Recording and Compiling Accident Statistics was formed to revise the accident cause code. The work of this subcommittee is now completed and is under consideration by the committee.

Existing codes, including those published and/or in use by the several states, the International Association of Industrial Accident Boards and Commissions, safety councils, and insurance companies, were accepted as raw material for study.

They consisted largely of a set of general headings without complete rules or definitions, plus a rather elaborate list of machines and equipment. Although these codes were termed "cause" codes the subcommittee found cause information almost entirely lacking. For example, provision was made in some cases for coding an accident that occurred to a person who came in contact with unguarded gears of a lathe, as follows:

1. General cause classification—Machinery
2. Specific agency—Lathe
3. Part of agency—Gears on lathe
4. Manner of performance—Operating Machine

There is no indication as to mechanical or physical cause or fault, nor is any provision made for recording the more common fault or cause data indicated by the unsafe act of a person, as when he removes a guard from gears in violation of instruction.

The major grouping of so-called accident causes as given in the codes and bulletins of several large industrial states was found to include, under one head entitled "General Cause Classifications", both machinery and falls of persons. These are totally

Committee Finds Need For Competent Code

A summary of the Accident Cause Code Subcommittee's findings and conclusions follows:

1. Existing cause codes make little or no provision for real cause data and permit grossly inaccurate conclusions to be drawn from such limited data as are recorded. Types of accidents, also physical or mechanical hazards, cannot be accurately recorded in existing cause codes.
2. Intense and growing pressure is being brought to bear for devising a better and more accurate method of coding accident data.
3. The demand for accurate and pertinent data requires the use by industry of an accident investigation report form containing questions designed to bring out specific information concerning the major factors of importance in accident occurrence. Industry agrees that these factors are the agency, the agency part, the kind of accident, the unsafe act of a person, the proximate reason for the unsafe act, and the mechanical or physical hazard.
4. A cause code structure designed to permit the tabulation of such facts requires separate recording of each separate fact.
5. The proposed code can be of value to the extent that industry is willing and able to provide the required data.
6. If no attempt is made to obtain such data the existing situation in regard to the use of accident cause codes cannot be improved.
7. The decision is one for industry and industrial accident code users to make. If the principles governing the structure of the revised code are acceptable and the proposed factors or headings are considered of chief value, approval would be in order and limited or complete use would then be made of the code when and if the approving interests found it feasible to do so.

dissimilar. The term "machinery" refers to mechanical objects. The "fall of a person" is a type of accident. It is conceivable that in a single accident a person may be injured by *falling* on a *machine*. If the accident is coded under both items, confusion, error, and worse will result. If it is coded under only one head, as "falls of persons", the total under "machinery" will be incomplete.

Machines should be one of a group of agencies including only objects or substances which meet the definition of "agency". The fall of the person should be one of a group of "kinds of accident", including only the actual accidents; such as struck by falling objects, falls of persons, caught in or between, etc. Only by such separate recording of the salient features of the accident can accuracy be attained.

"Pigeon Hole" Codes

It was found also that in existing codes the attempt had been to set up preconceived combinations of different kinds of data under single items, thus constituting a code that could be described as a pigeon-hole device. If and when an accident description fitted exactly into the given pigeon-hole the coder was required merely to identify the particular item and assign its code number to the accident.

The following example, which is typical of existing codes, will serve to illustrate the point. One code item reads: "Falls from cranes, derricks, elevators, or hoists while erecting or rigging." The fall of a person could not, of course, be recorded under this item if:

1. He fell from some equipment not specifically mentioned.
2. He was struck by an object instead of falling from it.
3. He was doing work other than erecting and rigging.
4. He fell on and not from the equipment mentioned.

Codes so constructed necessitate the inclusion of an infinite number of specifically described items so that all possible combinations of circumstances may be described, or else an arbitrary exclusion of all but such combinations as are judged at the moment to be of most importance. This means a multiplicity of places to look for information of substantially the same kind or the ability to forecast what is to happen.

The remedy, obviously, is to provide for separate coding of separate data.

Existing codes were found to be defective also in many other respects, such as:

1. Headings and groupings are not defined.
2. Headings and groupings overlap.
3. The cause of the accident is confused with the accident itself and with the injury, occupation, manner of performance, and mechanical hazard.

The first and most important requisite in establishing statistical procedure is that there shall be

a real necessity for the data desired and that these data shall be sufficiently accurate to be useful.

Conclusions as to Value of Existing Codes

No one denies the vital importance of data on the occurrence of accidental injuries but there is widespread dissatisfaction with such tabulated information as is now available. Specifically, it is charged that accident statistics are not pertinent and are grossly inaccurate. Careful research over a period of years, and mature deliberation, show that the charge is justified so far as it applies to national and state data and to those obtained in the great majority of industrial establishments. In Bulletin 276, U. S. Department of Labor, the following statements appear:

"The most cursory examination will show that the official industrial accident statistics of the United States are lamentably weak in . . . vital particulars. No one state has yet published statistics that are at all adequate to its own needs, and no two states have produced results that are at all comparable. . .

What makes accidents? In general, lack of mechanical safeguards, carelessness, fatigue are some of the causes. But the prevention of accidents depends upon more complete information.

The International Association of Industrial Accident Boards and Commissions, the National Council on Compensation Insurance, and the National Safety Council have taken the lead in developing a standard for accident statistics. Others working on the standard are:

Leonard W. Hatch, New York State Industrial Board, Chairman.
Cyril Ainsworth, American Standards Association, Secretary.
Aetna Life Insurance Company, Paul Dorweiler.
American Gas Association, E. P. Durfee, James B. Douglas (alt.)
American Iron and Steel Institute, Harry A. Schultz.
American Petroleum Institute, H. N. Blakeslee.
American Railway Association, Operating Division, Safety Section, T. H. Carrow.
American Statistical Association, Dr. Eugene B. Patton.
American Transit Association, G. T. Hellmuth, E. J. Murphy (alt.)
Electric Light and Power Group, C. R. Beardsley, A. B. Campbell (alt.)
International Association of Governmental Labor Officials, J. H. Hall, Jr.
International Association of Industrial Accident Boards and Commissions, Evan I. Evans, O. A. Fried, Leonard W. Hatch, Wm. J. Maguire.
Interstate Commerce Commission, Edward Crane.
Liberty Mutual Insurance Company, David S. Beyer.
Lumber Mutual Casualty Insurance Company, H. G. Wiberg.

The classification of accident causes is sometimes so meagre as to be of little value for prevention, sometimes so prolix and ill digested as to afford no comprehensive view."

Principles of Revised Code

Criticism of existing codes as given in the foregoing could not be constructive unless a remedy could be proposed. After lengthy consideration the subcommittee was fortunate in finding a solution to the problem which it has presented to the ASA Committee. The first task was to devise a sound code structure free of the defects in existing codes. This involved recognition of the following principles:

1. The several distinctive kinds of information to be coded must be specifically named and defined.
2. Separate kinds of information must be separately coded.

Analysis of existing codes and consultation with

Metropolitan Life Insurance Company, Robert J. Vane.
National Bureau of Casualty and Surety Underwriters, W. M. Graff, C. G. Van der Feen (alt.)
National Coal Association, J. William Wetter.
National Electrical Manufacturers Association, G. E. Sanford.
National Industrial Conference Board, J. A. Morford.
National Council on Compensation Insurance, H. F. Richardson.
National Safety Council, C. B. Auel, C. B. Boulet, Lewis DeBlois, W. Dean Keefer.
National Safety Council, Metals Section, E. F. Blank.
National Safety Council, Rubber Section, R. L. Foreney.
New York Edison Company, John Price Jackson.
New York State Department of Labor, Dr. Eugene B. Patton.
New York State Industrial Board, L. W. Hatch.
New York State Insurance Fund, M. H. Christopher-son.
Ocean Accident and Guarantee Corporation, Dan L. Royer.
Ohio Industrial Commission, Evan I. Evans.
Ontario Workmen's Compensation Board, T. Norman Dean.
Pennsylvania Department of Labor and Industry, Wm. J. Maguire.
Portland Cement Association, H. A. Reninger.
Travelers Insurance Company, H. W. Heinrich.
U. S. Department of Agriculture, David J. Price.
U. S. Department of Commerce, Bureau of Mines, W. W. Adams.
U. S. Department of Labor, S. W. Wilcox.
U. S. Department of Labor, Bureau of Labor Statistics, Sven Kjaer.
U. S. Navy Department, Wm. P. Biggs.
Utah Industrial Accident Commission, O. F. McShane.
Wisconsin Industrial Commission, O. A. Fried.
Members-At-Large, Dr. L. W. Chaney, M. G. Lloyd, Leifur Magnusson.

industrial executives and accident prevention engineers permitted the selection of the several distinctive kinds of information of value in accident prevention. They are:

1. The agency—meaning the machine, animal, vehicle, gas, acid, or other tangible object or substance chiefly concerned in the accident.
2. The agency part—meaning the gears on the machine or the wheel on the vehicle, etc. Obviously all agencies (gases, for example) do not have parts of interest. The code structure recognizes this point.
3. The manner of contact—meaning the kind or type of accident, as fall, struck by falling object, etc.
4. The unsafe act of a person—meaning removal of guards, standing under suspended loads, or otherwise exposing self in unsafe manner.
5. Reason for unsafe act—meaning mental fault, as reckless, etc., or bodily fault, as defective eyesight, etc.
6. Mechanical or physical hazard—meaning unguarded, defective, slippery, etc.

An additional item, namely, "performance of agency," meaning explosion, runaway, etc., was also identified but because of its infrequent use is not recommended by the subcommittee as a definite part of its proposed code except as optional procedure.

Notwithstanding the general agreement that these are the important factors of value in accident prevention, there is no statistical code effective anywhere in which they are all included. A brief discussion of them may therefore be of value.

Use of Accident Statistics

Progress in safety is retarded by lack of valuable accident data. Specifically, the employers and accident prevention engineers are handicapped in their efforts to control the most important element in accident occurrence, which is the unsafe acts of persons, because these are not identified or recorded and the specific acts at fault are therefore not known. They are at a loss in stopping falls of persons because they do not know how many falls there are nor why and how they occur. When and if these and other essential facts of accident occurrence are suitably recorded the frequency and severity rates may be expected to show a marked decrease.

If statistics show that unguarded machines cause accidents, the machines should be guarded. The present advanced stage of engineering knowledge makes light work of mechanical difficulties in designing guards and revising mechanical methods and processes.

It should be clearly understood that the revised code is devised primarily for the use of such agencies as now use codes, these being federal and state labor departments and industrial commissions and other institutions having and using code or tabulating equipment. The average industrial plant has no tabulating card equipment and would not use this or other codes. Such concerns

record accident facts on an accident investigation report. Under the revised code they would continue to do so but if agreeing to the revised principles they would make use of an accident investigation report form containing questions designed to bring out cause data.

As the revised code is set up, opportunity is provided for limiting its use to the barest essentials, also for expansion so as to provide the most complete kind of information.

When data have been recorded under the main headings given in the revised code it will be possible to draw off information of a single kind or in many combinations.

A start could be made with physical or mechanical faults. The analyst could find the total number of accidents in which fault is charged to an unguarded condition and could then determine what particular machines or other agencies were unguarded and what kind of accidents were produced by these faults.

Practicality of Revised Code

The headings in the revised code coincide with the natural sequence of events and circumstances that constitute an accident.

These are: (1) An unguarded machine or other mechanical or physical hazard and/or the unsafe act of a person, (2) the fall of a person or other type of an accident, resulting in (3) injurious contact with the machine, object, or other agency.

The machine or other object is selected as the accident agency primarily because it is unguarded or defective. The unsafe performance of a person is named because it resulted in the accident.

Definitions and rules are those which accident prevention engineers commonly apply in practice.

Thus, the revised code although it is more complete than existing codes, is not complex or difficult to use.

Australian Engineers Recommend Standards for Drawing Practice

The Institution of Engineers, Australia, has issued *Recommended Engineering Drawing Practice*, a comprehensive treatment of recommended drawing standards. The book is a revision of *Mechanical Drawing Standards*, originally published in 1926. The new edition includes drawing practice for all branches of engineering, and, where experience showed it to be desirable, modifies the recommendations concerning mechanical drawing standards which had been made in the first edition.

The book may be borrowed from the American Standards Association Library.

Steel Institute Technical Committee Reports Progress¹

Cooperation Between Mills and Technicians and Sales Executives Brings About Better Understanding

By

L. S. Marsh,

Manager, Department of Inspection and Metallurgy, Inland Steel Company, Chicago.

THE Technical Committee of the American Iron and Steel Institute, appointed in 1933, found that the most pressing subject would be a thorough study of the various sections of the book of "Uniform Extras and Deductions for Products of the Iron and Steel Industry under the Code of Fair Competition."

This study was considered necessary to correct errors, change the phraseology where the intent might not be clearly understood, and make such additions as seemed necessary for a clearer understanding of the details, particularly with reference to qualities, grades, and specifications.

Each of its 12 subcommittees acts as an informative group in connection with specific product classifications, e.g., Semi-finished; Bars; Plates; Tubular Products; etc. In nearly every case, the chairmen of these subcommittees are also chairmen of permanent committees handling similar products in the Association of American Steel Manufacturers' Technical Committees, from which organization the personnel of the Technical Committee was drawn.

Nearly 40 years ago the Association of American Steel Manufacturers was organized. The resolution which served to form this group reads: "Resolved, that a permanent organization be hereby formed to meet from time to time to discuss matters pertaining to the manufacture and use of steel." Certainly a broad field to cover but, as events proved, none too broad for the purposes of the organization thus begun.

Much Pioneering Done

The resolution plainly states the foundation on which all of the Association activities have been based. These activities have been, and still are, representative of much pioneer work in the standardization of metallurgical and technical practices employed in the manufacture, rolling, and finishing of general commercial steel products in this country.

One of the first jobs undertaken by the new organization was the standardization of specifications for structural and open-hearth plate steel, which included the first standard rolling tolerances for plates. The value of this pioneer work is evidenced by the fact that these tolerances, revised to provide for improvements in manufacture, have remained to the present time generally acceptable to both buyer and manufacturer.

The Association of American Steel Manufacturers developed the first standard sections for beams, channels, and angles known as "American Standard Section" which were uniformly adopted by the American mills.

Other activities of the Association may be briefly mentioned, as follows:

Standardization of tests for eye bar flats based on tests of material rather than on full-sized eye bars.

Agreement that the tensile strength stamped on boiler plates should be the guaranteed minimum.

The adoption in 1903 of a single grade of structural steel, with a tensile range of 55,000 to 65,000 pounds, instead of two grades with tensile ranges of 52,000 to 62,000 pounds.

¹ Abstracted from a paper read by Mr. Marsh, Chairman of the Technical Committee of the American Iron and Steel Institute, before the General Meeting of the Institute, May 24, 1934, at New York.

Twelve Subcommittees Studying Specific Standards Problems in Iron and Steel Industry Under General Technical Group.

and 60,000 to 70,000 pounds. This is representative of a type of standardization which is extremely valuable to both user and manufacturer. In this connection mention should also be made of the cooperation of the Association with the American Society for Testing Materials, during the past two years, in developing specifications for a "Medium Grade Structural Steel" with a tensile range of 60,000 to 72,000 pounds per square inch. It is expected that this new grade will gradually replace the present standard specification material.

Adoption of standard permissible variations in the weight of bar size angles.

Adoption of standard permissible variations in the size of hot-rolled rounds, squares, hexagons, and flats.

Standard Specifications for Concrete Reinforcement Bars.

Standard Specifications for Open-Hearth Steel Blooms, Billets, and Slabs for forging purposes.

Standard methods of sampling for check analysis.

Development of the Standard Specifications for Boiler and Firebox Steel.

Cooperation with the A.S.M.E. Boiler Code Committee, resulting in the adoption of specifications conforming to standard practice.

Adoption, in 1917, of a grade of steel known as "pressing steel."

During the past two years the Association has published tables for cutting and rolling tolerances for bars, tables of permissible variations for gage, flatness, camber, width, and length for plates over two inches in thickness and has been largely instrumental in developing standard specifications for tubular products. The standard chemical ranges and allowable variations therefrom, as established by the Association, were promulgated and generally accepted before the advent of the "Code."

Railroad Cooperation

For a number of years past the Rail Committee has been giving full cooperation to the American Railway Engineering Association in connection with specifications and special tests of rails in service. Present specifications for rails, tie plates, and spikes are the result of joint committee work between interested technical associations.

The Association has always worked in accord with the American Society for Testing Materials and while the Association has in the past promulgated numerous specifications for steel products, at the present time its policy is to refrain from specification writing, except by cooperation with other organizations. It believes that its activities will be of greater benefit to the industry if confined to studying the many variables covered by existing specifications, to standardizing mill tolerances for commercial and special products, and the rationalizing of chemical and physical requirements in order that they may conform to accepted mill practices.

In 1930 the name of the group was changed to "Association of American Steel Manufacturers' Technical Committees," in order to indicate more clearly the purpose and activities of the organization.

Committee Kept Busy

Time has proved that the program outlined at the organization meeting was sufficiently comprehensive to keep the Committee busy. Many of the members have devoted a large part of their time to the work; and at its first regular meeting the Committee was advised that it would be expected to make a thorough study of "Extras," from a purely technical standpoint. We realized then that a real job confronted us.

Competition should not be based on the technical details of a specification and certain requirements in a specification calling for a definite quality of material should be interpreted by all manufacturers in the same manner. I believe no one will take exception to this. There have been numerous specifications which call for a restricted tensile range and it needs no argument to indicate that where such restricted ranges are required an additional manufacturing hazard is involved. Other specifications stipulate chemical ranges which cannot be met or, if possible to do so, only with extreme difficulty.

Much of the time of the Committee has been given to studying such types of specifications with a view to eliminating unreasonable requirements or, by establishing a standard procedure, avoiding the troubles which have resulted from specifications of this type. In carrying out the first part of the program the Committee endeavored to harmonize the various Sections, particularly with

reference to chemical ranges and requirements. On first thought this appeared to be fairly simple and easy to accomplish but as the work progressed, many instances were encountered which did not permit such treatment.

It was found that users of wire and wire products were accustomed to different chemical ranges than those set up for bars and semi-finished; likewise, the requirements for plate material could not be standardized with other products as completely as seemed desirable. The numerous instances of this nature which were brought to light convinced the Committee that more harm than good would result from any attempt to hold too rigidly to a standardization ideal which, while highly desirable from a technical standpoint, might be objectionable to users of many products.

The Problem of "Extras"

The use of phraseology so definite as to permit no other interpretation than that intended has been no small problem for the Committee. It has been very conclusively shown that "intent," particularly where extras are involved, has no weight unless so clearly indicated that misinterpretation is impossible.

The question of manufacturing cost differentials which is reflected in the established "Extras" appears to be the subject of a great deal of misunderstanding and, from some quarters, severe criticism. Extras are pretty well understood by the experienced steel buyer, but to those not familiar with the purchase and use of steel and, to some extent with its manufacture, extras are sometimes open to suspicion.

While the Technical Committee has not completed its study of extras, considerable information has been obtained and this phase of the work will continue until the data secured on various products are sufficiently comprehensive to permit the compilation of average manufacturing cost differentials representative of the industry.

In considering manufacturing cost differentials, the technical committee has no interest in the base cost of ingots except as this may be influenced in the chemistry and open hearth practice involved. However, immediately with the changing of the ingot into some other product, certain definite costs are incurred. Such costs, continuing through each conversion must be taken into account and reflected either in the base price or through the application of an extra.

As a base price product on which we are justified in building our extras, we may consider that which is produced at a minimum cost with the greatest production rates. The user of bars, which are produced without pickling and chipping of billets, should not be expected to pay for such

French Steel Specifications

One of the largest American automobile manufacturers wrote us ". . . We are most anxious to obtain, or to have access to, specifications on French steels. . . ."

By return mail the American Standards Association information department sent 12 pamphlets covering French specifications of steels, and by parcel post, the French automobile standards handbook and other material bearing on this subject.

The ASA Information Service is available for the asking.

refinements where a lower grade material will answer the purpose. Likewise, a wide variety of products made from bars necessitates the pickling and chipping of billets and a heavy discard.

Certainly the user of this class of product should pay an extra for the greater demands which he makes upon the material. The buyer of plates used in the manufacture of a product requiring a surface practically free from defects, because of the kind of finish put upon the fabricated product, should understand that much greater preparation of slabs is required than would be the case were the plates to be used in fabricating ordinary tanks. This means, for the higher class product, that slabs must be "laid down" and chipped for the removal of surface defects. Here we have definite labor costs added to the mill slab cost and what could be more logical than asking the buyer of the more highly refined product to pay an extra for such requirements?

"Extras" Are Required

Sheet products, because of the multiplicity of uses, the demands for physical qualities which permit extremes in deformation, surfaces which will permit highly polished finishes and extremely close gage requirements for certain types of die operations, present a classification that requires the application of extras in order to carry on business with any possibility of fairness to both buyer and seller. Specifications requiring close chemical limits mean that additional cost is entailed, not only because of the greater difficulty in properly making the heat in the open hearth furnace itself but also on account of the hazard involved from "off-heats." There are numerous specifications in which the chemistry demanded is within such a range that, when the heat made for application against the order fails to come within the specified

range and is, therefore, an "off-heat," there may be no outlet for the steel.

Close Limits Are Costly

Specifications which demand close physical limits can be met only at an increased cost and both the restricted chemical requirements and those under the heading of physical requirements have been covered by the Committee in various sections of the book through the introduction of extras for "restricted requirements." There should be no attempt made to deprive a user of steel of close chemical and physical limit material, if such requirements are considered necessary in the manufacture of a product with which he is concerned.

Where such restrictions are demanded, it seems reasonable to take care of the situation by assessing a proper extra which fairly represents the increased cost involved. If it were left to the production departments of the various mills to decide what class of product it would be their preference to make, it is, I believe, a safe assertion that they would not select products, which, generally speaking, were subject to extras. While it is presumed that extras cover the actual cost incurred in producing the material, some of the factors affecting such costs are more or less indeterminate and it is questionable whether the extras, in many cases, cover the total costs.

That the basic idea of extras is sound may be assumed from the fact that they have been a part of the steel business for many years and with the careful study given to mill costs during recent years, extras have been established as fair and equitable. Notwithstanding the greater refinements in the manufacture of certain products made possible during the past few years, it is doubtful whether careful analytical study of mill costs will tend toward any general lowering of extras. The opposite may be quite possible because of increased wages and shorter hours in the industry.

The Technical Committee has, in addition to the work outlined in this paper, been called upon to make recommendations for the correct technical descriptions and classifications of products filed with the Iron and Steel Institute, and to consider technical questions involved in complaints.

The Committee has found, after studying certain product classifications and after making recommendations concerning them, that the Commercial Committee could not adopt the recommendations because of commercial aspects which were based upon trade usages of long standing. By cooperation with the Commercial Committee, it has been possible to come to a better understanding of all the factors entering into the handling of the various products.

French Auto Makers Save with Standards

Price reductions, in some cases of 86 to 95 per cent, resulted from the standardization of automobile parts in France, according to the Report on Economic Conditions in France issued by the Department of Overseas Trade.

The number of different types of caps for radiators and gasoline tanks was reduced from 88 to 5, accumulators from 120 to 7, brake linings from 320 to 28, and dynamos from 30 to 4.

From the time the standardization work was started in 1926 by a normalization bureau set up by the Association of Accessory and Spare Parts Manufacturers, to 1933, 186 automotive parts had been standardized. The French motor car industry, because of the large number of small manufacturers, offered an especially promising field for standardization.

Management Societies Consolidate Offices

A new association for management societies has been organized with the recent consolidation of the Taylor Society and the Society of Industrial Engineers to form the Federated Management Societies. Economies in office expense and in administration are expected.

W. H. Leffingwell, president of the Taylor Society; John C. Shover, president of the Society of Industrial Engineers; Walter D. Fuller, vice-president of the Taylor Society, and Henry P. Dutton, vice-president of the Society of Industrial Engineers form the joint operating council which has authority to operate the two societies as a joint organization.

Each Society under the new arrangement will retain its own identity, and members will continue membership in their respective societies. Objectives of the joint organization are:

- (a). To unify and strengthen an organized professional movement in the field of management.
- (b). To encourage other management societies to join the nucleus established by the Society of Industrial Engineers and the Taylor Society.
- (c). To effect substantial economies by consolidating the offices of the two societies.
- (d). To preserve the corporate identities of the participating societies.

U. S. Manufacturer Receives Standards for Paris Pipe

One important American manufacturer asked us recently if we knew what standards were used by the city of Paris, France, for 150-pound pipe flanges. Copies of the Paris pipe standards were forwarded.

Chain Stores Cooperate for More Informative Labels

The Food and Grocery Chain Stores of America, a trade association of practically all the country's food store chains except A & P, has offered its "active support" in the drive to establish quality standards and grades and more informative labels for canned foods. A telegram to Division Administrator Armin W. Riley from F. H. Massmann, president of the organization, reports that a committee of his association has unanimously agreed to "urge the adoption of the standards established by the Department of Agriculture on all their canned goods" and to "adopt informative wording on all canned goods labels clarifying the contents to the consumer." It pledges "whole-hearted support and active assistance in this important matter."

The telegram announces the appointment of a committee to "recommend proper wording for labels which will give the consumer such information as will be of practical value to her, and will assure the quality of the merchandise being in accordance with the label." The wire states that "we fully appreciate the desirability of having the consumer properly informed as to what she is buying in a hidden package."

The chains which are members of the association have more than 23,000 retail stores. Their private brands of canned foods account for more than 15 per cent of the total pack, it is estimated.

The association's action is regarded by Administration leaders as an important victory in the campaign for grades, standards, and proper labeling provisions in the canning code. The drive opened when President Roosevelt, in approving the code, stipulated that the industry should investigate the practicability of such standards provisions and report to the Administration. The preliminary report of the industry, submitted some weeks ago, was termed "inadequate" by Government advisers appointed to study the subject.

The present telegram follows closely Division Administrator Riley's appointment of committees of wholesalers and chain store executives to advise him in drafting standards provisions for the canning code.

The text of Mr. Massmann's telegram follows in part:

"It is a pleasure to hereby report to you that they unanimously agreed to immediately urge the adoption

of the standards established by the Department of Agriculture on all their canned goods or to earnestly assist in the establishing of consistent standards where they do not exist; also to adopt informative wording on all canned goods labels clarifying the contents to the consumer, and to accomplish same as rapidly as possible.

"As the first move in this direction I have appointed a Committee of Food and Grocery Chain Store Operators with Warren H. Clarke (Kroger Grocery and Baking Co., Cincinnati), Chairman of said committee and those present at Monday's meeting as members. This committee will analyze the requirements of each canned commodity and forward their findings and recommendations to the Chairman who in turn will coordinate same and arrange for a conference with you for final adoption. Our entire membership will then be informed and urged to adopt same.

"Simultaneously, John A. Logan, our Executive Vice-President, will obtain from Williams of the U. S. Department of Agriculture present approved standards of various canned goods and forward same to members of the Committee for their study, so that they in turn may recommend proper wording for labels which will give the consumer such information on the label as will be of practical value to her, and that will assure the quality of the merchandise being in accordance with the label.

"As practical food and grocery distributors contacting the consumer daily, we fully appreciate the desirability of having the consumer properly informed as to what she is buying in a hidden package; and I am pleased to be able to assure you of the whole-hearted support of our entire membership and, particularly, the active assistance of the members of the above-mentioned committee who have had an opportunity to be informed first hand as to the objective and desires of the Administration in this important move.

"We are taking this action fully confident that once consistent standards and proper labeling have been established, the entire industry will hail it as an advantage and support it to a final conclusion. I would greatly appreciate your approval of above proposed active support of this project."

A & P Will Use U. S. Grades On Canned Food Labels

The Great Atlantic & Pacific Tea Company is revising its canned food labels to make them conform to the grades defined by the U. S. Department of Agriculture, according to word received by the National Recovery Administration.

John A. Hartford, president of the A & P, has

Dr. Frederic C. Howe, Consumers' Council of the AAA, joined with the Consumers' Advisory Board of the NRA in commending the A. & P. Stores for their decision to "play ball" with consumers by giving them recognizable quality grades on canned goods.

"The determination of this great distributing house to use the grades of the Department of Agriculture on their labels, is exceedingly gratifying to this Administration. Consumers stand to win from this move by being able to buy more wisely and economically. The house that furnishes them with Government graded goods stands to win the greater confidence of its customers, he said.

"I want to congratulate this organization for its frank recognition of consumers' right to know what they are buying. I want also to assure other canners that the same reward which will accrue to the A. & P. only awaits their decisions to adopt the same far-sighted policy."

sent the following telegram to Division Administrator Armin W. Riley:

"Regard to the proposed government gradings on canned food labels, we wish to go on record favoring the plan, believing it advantageous to consuming public. Will therefore proceed immediately to incorporate necessary changes on new labels to conform to various grade definitions laid down by Department of Agriculture."

This telegram confirms an agreement reached with the company by Mr. Riley whereby the company will use all the canned food grades which are now or may be in the future promulgated by the Department of Agriculture.

The A & P not only packs large quantities of canned foods under its own brands, but also purchases the pack of commercial canners for its own labels. The company is the world's largest unit of grocery distribution, having slightly more than 15,000 retail outlets. Its private and controlled brands, which will be affected by this decision, take approximately 10 per cent of the total pack of canned foods.

Libby, McNeill & Libby, large Chicago packers of canned foods, have sent Mr. Riley copies of their newly designed labels for canned peas and beets, containing a graphic illustration of the size of the peas and telling the number of beets contained in the cans. The company is also

distributing to consumers a chart and pamphlet defining the grade names used on its labels. While consumers' organizations point out that these labels do not yet state Government grades, great satisfaction is expressed that at least a start has been made.

The immediate and favorable results from the present drive to make canned food labels more informative have been very gratifying to NRA officials. Past efforts of consumers and governmental agencies in the same direction have met with little or no success. The present campaign was started when President Roosevelt demanded, as a condition of his approval of the canning industry code, that a committee recommend provisions on standards for inclusion in that code.

While a great deal remains to be done before a consumer can tell from the label what a can actually contains, the action of these two large distributors is hailed as a distinct gain and a considerable forward step. It follows yesterday's appointment of committees of wholesale grocers and of chain store executives to advise the NRA in drafting standards provisions to add to the canning industry code.

Decrease Size Variety Of Milling Cutters

A substantial decrease in the number of stock sizes and varieties of milling cutters recommended in previous editions was made in the recent revision of Simplified Practice Recommendation R36-34, just published, according to an announcement of the Division of Simplified Practice, National Bureau of Standards.

Diameters, thicknesses, and other important dimensions of various types of milling cutters, such as plain milling, involute gear, screw slotting, keyseat, end mills for various purposes, and slitting saws, used on machine tools, are covered in the Recommendation.

Copies can be purchased from the Superintendent of Documents, Government Printing Office, Washington, D. C., or through the ASA office, at five cents each.

English Standardize Inexpensive Bath Tubs

A new design for English bath tubs which can be manufactured by mass production methods and sold at a low price was announced in the *Manchester Guardian Commercial*, June 2. The new design is easier to clean than the old, the report states, is modern in appearance, minimizes splashing, and needs less hot water. It can be fitted into a bathroom as small as 5 ft by 4 ft.

Plumbing Code Work Continued by American Standards Association

LONG overdue attention has been focused within the last year on the relation of plumbing to health with the amoebic dysentery outbreak in Chicago serving as the focusing medium. Epidemics of this nature are a severe reminder that control of plumbing in buildings must be maintained through proper enforcement of adequate and reasonable plumbing regulations. Public health officials, sanitary engineers, master plumbers, and others with a special knowledge of plumbing have pointed out that epidemics might happen at any time where plumbing is inadequately controlled.

Plumbing control is a function of the state, or the municipality. Up until 1923 those responsible for drafting plumbing regulations found it difficult to obtain well recognized criteria on which adequate and reasonable plumbing regulations could be based.

The Subcommittee on Plumbing of the Department of Commerce Building Code Committee was given the task of drafting an advisory plumbing code which would point the way toward more economical plumbing requirements commensurate with the public health. An extensive program of research on the hydraulics of plumbing systems was undertaken at the National Bureau of Standards in order that test results might be available to the Subcommittee as an aid in reaching rational conclusions.

The first report of the committee was issued in 1923 under the title, "Recommended Minimum Requirements for Plumbing in Dwellings and Similar Buildings."

Further study led to a second report in 1928 and revised in 1931 entitled, "Recommended Minimum Requirements for Plumbing."

While disagreements have arisen over some parts of this report, some 300 municipalities as well as several states have utilized it in whole or in part as a guide in drafting their plumbing regulations.

When Committee A40 on Standardization of Plumbing Equipment was organized, the committee agreed that standardization work on plumbing equipment was dependent to a large extent on an adequate plumbing code. Subcommittee 1 of A40, a subcommittee on plumbing codes, was therefore made identical in membership with the Subcommittee on Plumbing of the Department of Commerce.

Plumbing Authorities Who Recommended Plans

The preliminary meeting on plans to continue the Plumbing Code work, held in New York on June 25, was attended by the following:

James W. Armstrong, *Building Officials Conference of America.*

William H. Gompert, *American Institute of Architects.*

William C. Groeniger, *Consulting Sanitary Engineer, Chairman, ASA Sectional Committee, A40.*

R. B. Hunter, *National Bureau of Standards.*

C. B. LePage, *American Society of Mechanical Engineers.*

W. J. Luff, *American Society of Civil Engineers.*

A. R. McGonegal, *American Society of Sanitary Engineering.*

Jere L. Murphy, *Construction League; National Association of Master Plumbers.*

George N. Thompson, *Member-at-large.*

When the government economy program went into effect in 1933, the Department of Commerce found it necessary to discontinue its Subcommittee on Plumbing. Reduced appropriations made it necessary for the National Bureau of Standards temporarily to halt a further program of research on plumbing that had been started but only partially completed.

Through an arrangement with Secretary Roper of the Department of Commerce¹ this plumbing code activity is being continued under the procedure of the American Standards Association, the National Bureau of Standards cooperating in the program.

At a recent meeting of a special committee au-

¹ INDUSTRIAL STANDARDIZATION AND COMMERCIAL STANDARDS MONTHLY, March, 1934.

Public Protection Seen In Plumbing Code Work

Appalling in its possible consequence to human life is the fact that water which is safe when it leaves the reservoir or pumping station may not be safe when it flows out of the faucet.

Pipes carrying pure water are sometimes connected with pipes containing unsafe water. Cross connections in the labyrinth of pipes leading to dwelling places, made without proper supervision, may allow sewage in plumbing fixtures and apparatus to flow into the water-supply distributing system.

thorized by the Chairman of the Standards Council to consider this subject, resolutions were adopted for consideration of Standards Council.

Continuation of the work on plumbing codes is of very definite interest to public officials, the plumbing trade, manufacturers, consumers, and other interests. The public health is to a large degree dependent on carefully drawn and properly enforced plumbing codes. No compromise should be made that would in any way tend to lower health standards. However, the public should not be burdened by requirements which add unnecessarily to the cost of plumbing installation without assuring additional safety.

The status of plumbing codes in cities of over 5,000 population according to the 1930 census as given by the 1933 statistics available from the Division of Building and Housing of the National Bureau of Standards is as follows:

151 cities had plumbing codes 20 years old or over;

102 had plumbing codes 15 to 20 years old;

181 had plumbing codes 10 to 15 years old;

401 had plumbing codes 5 to 10 years old; and

185 had plumbing codes less than 5 years old.

In addition 331 cities reported that they have no plumbing code. In some of these cities reporting no code, state regulations control plumbing installation.

Revision of plumbing codes is a constant process. If this revision work is to be logical and orderly, if the public health is to be protected at no undue expense to its pocketbook, the value of well-considered plumbing standards, kept abreast of progress, can hardly be underestimated.

Iron and Steel Institute Is New ASA Member-Body

The American Iron and Steel Institute is a new Member-Body of the American Standards Association. As the coordinating organization for the entire iron and steel industry, the Institute has an outstanding interest in the progress of standardization affecting both the products and the raw materials of the industry. Membership in the American Standards Association gives the Institute close contact with the unified national standardization work as carried on by the ASA, the coordinating standards agency.

The Institute is already represented in the safety work of the American Standards Association.

Ampere Is Redetermined By Bureau of Standards

There has been no important change in the value of the unit of electric current as maintained by the National Bureau of Standards since 1911. Research work just completed¹ discloses the following relation: 1 National Bureau of Standards International Ampere = 0.999928 Absolute Amperes. The 1911 measurements showed the Bureau of Standards unit at that time was 0.999926 Absolute Amperes,¹ a difference of only two parts in a million.

In 1928, the International Committee of Weights and Measures decided to adopt the absolute electrical units, and to base the value of working standards on the results of absolute determinations. This research work is a part of the contribution of the National Bureau of Standards to the world project.

The current balance used in 1911 was used, although the apparatus was improved in many details. The instrument measures the strength of current by balancing the attraction or repulsion of two parallel currents against a weight.

Beside the international aspect of this work, these measurements showed the constancy of the National Bureau's electrical standards.

A recent estimate of the value of the Bureau of Standards international ohm in absolute measure was:

1 B.S. international ohm = 1.000460 absolute ohms.

From this estimate and the present results on the determination of the ampere, the value of any electrical quality can be estimated in absolute units from its value as measured in international units. For example:

1 B.S. international volt = 1.000388 absolute volts

1 B.S. international watt = 1.000316 absolute watts

¹ Harvey L. Curtis and Roger W. Curtis, "An Absolute Determination of the Ampere," *Bureau of Standards Journal of Research*, June, 1934.

Standard Symbols Eliminate Chaos

Writers on engineering subjects are urged by the American Society of Civil Engineers to use the standard symbols and abbreviations approved by the American Standards Association. Practical engineers must learn innumerable technical languages in order to keep their engineering knowledge up to date, says an article in *Civil Engineering*, July. Intimate association with his special subject gives a technologist numerous individual preferences as to symbols and definitions of technical terms, and therefore before writing his papers each technologist first writes his personal dictionary.

To provide a dictionary of standard symbols

and abbreviations which will simplify both the writing and reading of technical papers the American Society of Civil Engineers, the American Institute of Electrical Engineers, the American Association for the Advancement of Science, the Society for the Promotion of Engineering Education, and the American Society of Mechanical Engineers assumed the leadership in developing standard symbols and abbreviations and in correlating them to avoid duplications. Twelve standards, comprising symbols and abbreviations used in as many different fields of engineering, have been approved by the American Standards Association.

A.S.T.M. Committee Will Standardize Tests for Gas

Standard methods for testing the \$685,000,000 worth of natural and manufactured gas used in the United States will be developed by a new committee being organized by the American Society for Testing Materials.

The variety of regulations imposed by cities to govern the quality of gas sold to city users, and the diverse needs of commercial users, who may require some specific property in the gas they are buying, make the problem of testing gas of vital importance to approximately 15,000,000 gas customers. Confusion in the results of tests, and controversies between buyer and seller caused by the use of different procedures for sampling and testing the same product, will be eliminated by the establishment of standard methods, it is expected.

The scope of the new committee will include nomenclature, as well as standardization of methods of sampling and testing gaseous fuels as these methods apply to purchases and sales and to the requirements of regulatory bodies. Tests used by companies during the development and control of commercial processes in which gas is used are not included in the work of the committee. Acetylene and other bottled gases (propane, butane, etc.) will probably not be studied by the committee at present, but they have not been definitely excluded from the scope of the work which may be undertaken in the future.

The committee is being organized by a steering committee of which A. C. Fieldner, chief engineer, Experiment Station Division of the U.S. Bureau

of Mines, is chairman. The natural gas, manufactured gas, petroleum, iron and steel, non-ferrous metallurgy, zinc smelting, and automotive industries are among those which will be invited to join the work. Government regulatory bodies, and Canadian industrial groups will also be included. Other organizations which are being invited to join include the A.S.M.E. Power Test Code Committee, the American Society of Metals, and the American Ceramic Society.

To Study Fire Hazards Of Static Electricity

E. E. Turkington, member of two American Standards Association sectional committees, has been appointed chairman of the National Fire Protection Association's new committee on Static Electricity. The committee will prepare recommendations on methods of eliminating or controlling the hazard of ignition by static electricity.

Fiberloid Corporation Executive Appointed

E. A. Wilson, a member of the technical committee appointed recently to write specifications, methods of test, and performance requirements for Safety Glass, representing the Cellulose Plastics Manufacturers' Association, is an executive of the Fiberloid Corporation, Indian Orchard, Mass., and not the Fibroid Corporation, as erroneously announced in the June issue of this magazine—EDITOR.

Consumer Standards

Manufacturers and distributors will adopt any merchandising policy if they are sure the ultimate consumer wants a change.

Simple, specific, factual data on labels sounds Utopian. Establishing such standards as would be necessary is a task beset by enormous difficulties.

But if consumers believe their best interests are to be served through grade marking and labeling, the day will come when merchandisers and manufacturers alike will sell goods by facts—not adjectives and theories.

MOST of us greatly under-estimate the enormous difficulties to be met in establishing standards for consumer goods. To bring about the use of standards and factual labeling in any large part of the commodities sold to the ultimate consumer would, in my opinion, constitute a major step in the economic and social integration of our civilization.

To see how great the difficulties are, one has but to remember that throughout human history the policy of "letting the buyer beware" has been well-nigh universal. All of our revolutions, political, technical, and economic, have left this principle enthroned. The movement for standards will succeed or it will fail according as retailers feel, or do not feel, a demand for it and a response to it from their own customers in the actual routine of making sales.

The efforts of the American Home Economics Association, the extensive and effective promotional efforts of the Consumers' Advisory Board of the NRA, the efforts of the national Administration, even mandatory laws should they be enacted by Congress, will, I think, fail if consumers are

not interested enough to respond to the movement in their buying habits.

To a large extent retailers, manufacturers, and advertisers now look at the movement as a "brain trust" movement—as an army made up wholly of generals. In any movement such as this many thousands of everyday consumers are needed as active privates, together with many top sergeants.

The work the Home Economics group is doing on the buying problems of the individual—such as buyers' clinics studying actual cases—seems to me to be one of the most significant phases of the entire movement. It constitutes, perhaps, the best available opportunity for bringing action where it is most needed; *viz.* upon mail order houses, the chain stores, and department stores.

Let us think of some of these opportunities in connection with the mail order houses, because they have made more use of technical standards and are closer to the subject than any other distributor group.

Stores Want Facts

First, let us realize that the distributor and manufacturer will adopt any reasonable program or policy of merchandising if he can be assured that the ultimate consumer will support him in it. He is not impressed with the theories of the

¹ Abstract of a paper read by the author before the 27th Annual Meeting of the American Home Economics Association, June 28, in New York.

Action Versus Wishful Thinking¹

by

P. G. Agnew,

*Secretary,
American Standards Association*

generals I spoke of. If the rank and file of buyers are dissatisfied with merchandising policies and will register their complaint as individuals—not so much as a part of a “movement” but as individual customers—the merchandisers will not be long in seeing their point of view.

An executive of one of the large mail order houses, who is enthusiastic about the movement for standards and factual labeling, said to me the other day that 200 letters, evidencing interest on the part of the typical consumer, would do more to achieve the goal of such a program than all of the formal efforts of such organizations as the Consumers' Advisory Board of the NRA and the American Home Economics Association. A letter written with lead pencil is likely to be far more potent in bringing this matter to the attention of the top executives than formal communications from organized groups. Hundreds of thousands of *individuals* are the customers of these houses. Unless the ideas of your Association are expressed by *individuals* they will, I believe, be fruitless.

In trying to make selections from catalogs, as in standing before a counter, we all frequently have a feeling of helplessness in deciding which item best suits our own need. The descriptions of the different grades are so nearly identical that we have to rely chiefly on price as an indirect measure of quality. Turn at random to the pages of a catalog and one sees how little difference there is, whether it be hosiery, underwear, kitchen utensils, or razor blades. Occasionally the statement that “this is our top grade” gives one a feeling of relief in having one definite point of reference.

As indicated by the department head just quoted, a few hundred or a few thousand letters

dealing with concrete cases and asking for definite grades and labels would, I believe, have a telling effect on the attitude of sales executives.

Returned Goods Evil

Perhaps the best opportunity is in connection with the return of unsatisfactory merchandise where the customer may feel that she has been misled by the lack of adequate grading or grade designation. Merchandise managers are extremely sensitive to this “returned goods evil,” as it is called, and are spending large sums of money investigating its causes, and cures for it. Hence, concrete cases which the customer believes would have been prevented by grade definitions or other standards can be used with particularly telling effect.

I do not know of a more effective method for registering dissatisfaction with the present-day vagaries in representing quality of goods purchased over the counter than by using the American Home Economics Association's “Consumer Purchasing Leaflets.” The first three in the series tell the housewife what she should know when buying sheets, blankets, and refrigerators. Other leaflets in this series would be of great service to consumers.

If leaders in this movement can get women to take these leaflets with them when making their purchases, and refer to the information therein, they will be doing fine yeoman service. These should be referred to when goods are returned because of dissatisfaction or misrepresentation. Every time the attention of a merchandising manager or the president of a store is called to these leaflets it will be one more step toward the goal of scientific, simple grading of merchandise.

A store can be either a purchasing agent for the customer or else simply an outlet for manufacturers. Every progressive store in the country will unhesitatingly accede to the wishes of its customers if management can appraise these wishes. You may be sure of that. Stores pay vast sums to find out what the public wants. Because stores are anxious to please their customers, everything the American Home Economics Association

and its members can do to bring about acceptance of the idea of grade marking and labeling will be, in its last analysis, a service to the manufacturer, the distributor, and the advertising man.

Common Language Needed

A keystone to the structure of "better buymanship" is a common language for grades. Let me simply indicate the confusing complexity of the present situation. Would the consumer find his problems easier if there were available a standard grade nomenclature such as A, B, C, and D; or No. 1, No. 2, No. 3, and No. 4; or if names were used, such as "Fancy," "Choice," "Standard," and "Commercial"? If such a simplification appeals to them, they would be preparing the way for a general acceptance of the idea by asking the stores why they do not adopt some such plan and by insisting that sales people and store executives give them pertinent facts about the things they buy.

This is today's challenge to leaders in home economics. In every respect it fits into the progressive movement that is the New Deal. And like other phases of the New Deal, its tentacles must reach into the far places of the country, into the hamlets and villages, into the farm areas and ranches, as well as in the great metropolitan centers of the country. And through you and other leaders in this intelligent buying movement the Parable of the Wise Buyer will be carried back from the frontiers to the store managers, chain store and mail order house executives—and order will come forth out of chaos and confusion.

Master Plumbers Name Council Representative

The National Association of Master Plumbers of the U. S., which recently became a Member-Body of the American Standards Association, has named Jere L. Murphy, President, J. L. Murphy, Inc., New York, as its representative on the Standards Council. Mr. Murphy has been in close touch with the work of the American Standards Association for some time as representative of the National Association of Master Plumbers on several ASA sectional committees. He is a member of the committees on Standardization of Plumbing Equipment, on Standards for Drawings and Drafting Room Practice (exclusive of architectural drawings), and on Approval and Installation Requirements for Gas Burning Appliances.

A. R. McGonegal, Chairman, Sanitary Committee, Washington, D. C., is alternate for Mr. Murphy on the Standards Council. Mr. McGonegal represents the American Society of Sanitary Engineering on the sectional committee on Screw Threads for Hose Couplings.

McBurney Joins ASA Staff in Washington

J. W. McBurney, research associate at the National Bureau of Standards for the Asphalt and Mastic Tile Association, has joined the staff of the American Standards Association.

Graduated from Ohio State University in 1913, Mr. McBurney served as bacteriologist with the U. S. Public Health Service for five years. For three years he was chemist for the Youngstown Sheet & Tube Company. He took post-graduate work at George Washington University, Washington, D. C.; Case School of Applied Science, Cleveland.

In 1921 he went to Cleveland as testing engineer for the Cleveland Board of Education, where he was instrumental in setting up technical specifications for building materials and a wide range of school supplies, and establishing methods of tests for them. A majority of these specifications are still in use by the Board.

After two years as Director, Technical Service Department, Standard Paint & Lead Works, he became research associate for the Common Brick Manufacturers Association at the Bureau of Standards from 1926 to 1932.

A member of nine engineering and scientific associations, Mr. McBurney is a member of three American Standards Association Sectional Committees, and has served on numerous committees of other associations.

Mr. McBurney will be in charge of the American Standards Association work in connection with Commercial Standards and Simplified Practice Recommendations, at the National Bureau of Standards, Washington, D. C.

Offers Services to U. S. Housing Agencies

Services of the National Fire Protection Association have been offered to Federal housing and slum projects.



J. W. McBurney

Exhaust Code Committee Urges Representation of All Interests

Committee Works to Minimize Hazards to Workers from Exposure to Dusts

Industry Now Subject to Severe Compensation Demands Through Lack of Standards

The rapid increase in the use of chemicals, abrasives, spray paint, and other practices which can cause physical harm to industrial workers, has made factory exhaust and ventilating systems an important managerial and engineering problem.

Because these hazards are found in so many industries, this project of the American Standards Association has assumed major proportions. The group in charge of this work is the Exhaust Code Sectional Committee, organized in 1933, with John Roach, Deputy Commissioner of Labor, New Jersey, chairman.

The scope of the Exhaust Code will be confined solely to the elimination of injurious dusts, fumes, and gases at the point in any industrial process where they are generated. All matters of general ventilation are assigned entirely to the Ventilation Code (Z5) which is being concurrently developed under the leadership of the American Society of Heating and Ventilating Engineers.

The Exhaust Code Committee has approached this problem by a step-by-step development of standard specifications of exhaust hood designs and air velocities separately for each distinct process or industry. Thus, each group of specifications will constitute a separate standard applicable only to the specified process or industry. Initial projects upon which subcommittees are about to be appointed are as follows:

1. Abrasive Cleaning
2. Chromium Plating
3. Granite Cutting
4. Rock Drilling
5. Spray Coating

While it is contemplated that additional exhaust specifications will be developed for additional processes as opportunity offers, the above group was chosen because there appears to be already available sufficient data from field studies and laboratory research upon which reasonable and adequate standards can be based.

From the beginning, it has been a fundamental requirement of the American Standards Association that every Code development shall have back of it the approval of a Sectional Committee of which the membership includes all organizations interested therein: manufacturers, users, state and federal authorities, insurance companies, and specialists in each field. In general, members are officially representative of national organizations whose interests are involved.

In the particular case of the Exhaust Code, its practical application is so widespread that the American Standards Association officials are still seeking the cooperation of additional national organizations to appoint their representatives to assist and guide in the development of these specialized exhaust specifications. It is urged that all national industrial organizations not yet represented communicate promptly with Cyril Ainsworth, assistant secretary, American Standards Association, in acceptance of membership either on the main Exhaust Code Committee or upon such subcommittees as will develop the specifications for particular processes in which they have special interest.

Severe Claims Cited

During the past several years there has developed in many industries throughout the country a very exceptional and severe claim situation based on the alleged exposure of industrial workers to a considerable variety of materials that contaminate the workroom air—the claims being based on so-called "occupational diseases" resulting from the inhalation of air containing allegedly injurious substances in dangerous concentrations. While the accurate evaluation of these occupational disease claims is a medical one beyond the scope of ASA undertakings, the problem of minimizing the exposures in question is largely

an engineering problem of exhaust equipment applied to the process that causes contamination of the workroom air, a problem quite amenable to standardization. No uniformity of practice throughout industry has developed as yet to meet the situation.

Of considerable importance in this connection is the wide variation in existing State Labor Department Regulations that have been promulgated to correct the hazards here in question. In many instances, these regulations are too general in phraseology to prove of assistance to industry in applying specific corrective measures. In other instances the standards of performance are set impracticably and unnecessarily high. In general, it is fair to say that these local regulations have not been worked out with sufficient technical skill to prove of practical value to plant managements in their efforts to solve their occupational disease problems.

Use Technicalities

In addition and quite unfortunately the mere technicalities of State Regulations are at times being utilized in law suits to establish the legal status of negligence more or less regardless of any medical proof that injury has actually been received by the claimant in the course of his employment. It is the hope of the Exhaust Code Sectional Committee that national standards for exhaust of numerous industrial processes can be developed with such weight of technical authority back of them that ASA Standards will ultimately replace all local state standards, thereby furthering the basic purpose for which the American Standards Association was created.

Already, the financial losses incurred by industries throughout the country from occupational disease claims have mounted into millions of dollars and there appears to be an increasing demand from all persons interested that adequate but practically reasonable standards be developed for these hazards, especially along the lines of exhaust equipment which is the logical solution of the great majority of industrial hazards of this type. The Exhaust Code Sectional Committee has an extensive problem before it that involves a considerable volume of detail and it welcomes the full cooperation of all who can assist it in this work.

French Ask for Dam Specifications

The French national standardizing body recently asked the American Standards Association for the U. S. Bureau of Reclamation specifications used in the construction of Boulder Dam. The ASA Library sent them the specifications.

Wide Range of Interests Represented in Work

Factory equipment makers, foundrymen, chemists, electrical manufacturers, insurance men, labor officials, and representatives of Government departments are among those who will help to outline standard practices to protect workers from injurious dusts and fumes in factories. The International Association of Industrial Accident Boards and Commissions has taken the leadership in the work.

The following are members of the committee which will develop the standard:

John Roach, International Association of Industrial Accident Boards and Commissions, *Chairman*.

Cyril Ainsworth, American Standards Association, *Secretary*.

American Foundrymen's Association, **T. W. Pangborn**, **James R. Allan**, (*alt.*).

American Public Health Association, Industrial Hygiene Section, **Dr. Henry Field Smyth**.

American Society of Heating and Ventilating Engineers, **Wm. M. Wallace II**.

American Society of Mechanical Engineers, **J. C. Hardigg**, **E. H. deConingh**, (*alt.*).

Association of Manufacturers of Woodworking Machinery, **F. G. Walker**.

Foundry Equipment Manufacturers Association, **S. C. Vessy**, **V. E. Minich** (*alt.*).

International Association of Governmental Labor Officials, **John Roach**.

Manufacturing Chemists Association, **H. L. Miner**.

National Association of Fan Manufacturers, **H. M. Nichols**, **W. F. Wrightson**, **W. Gardner** (*alt.*).

National Association of Mutual Casualty Companies, **S. E. Whiting**.

National Bureau of Casualty and Surety Underwriters, **R. C. Stratton**, **W. M. Graff** (*alt.*).

National Electrical Manufacturers Association, **R. C. Allen**, **G. E. Sanford** (*alt.*).

National Founders Association, **T. W. Pangborn**.

National Safety Council, **J. C. Wilson**, **J. E. Culliney** (*alt.*).

National Spray Painting and Finishing Association.

U. S. Department of Agriculture, Bureau of Chemistry and Soils, **Hylton Brown**, **Roy L. Hunt** (*alt.*).

U. S. Department of Commerce, Bureau of Mines, **W. P. Yant**, **Dan Harrington** (*alt.*).

U. S. Department of Labor, **Roy Kelsey**.

U. S. Department of Labor, Bureau of Labor Statistics, **Sven Kjaer**.

U. S. Treasury Department, Bureau of the Public Health Service, **J. J. Bloomfield**, **J. M. Dalle Valle** (*alt.*).

Members-at-Large, **L. A. DeBlois**, **Prof. Philip Drinker**, **Dr. Leonard Greenburg**, **Dr. William J. McConnell**.

Industrial Standardization— Its Principles and Application

by

R. E. W. Harrison,¹

*Chief, Machinery & Agricultural Implements
Division,*

*Bureau of Foreign & Domestic Commerce,
U. S. Department of Commerce.*

THERE are few progressive manufacturers today who are not thoroughly convinced of the economic desirability of a co-ordinated plan of company and national standardization effort, but there are many in this group who are not so well posted on the ways and means available whereby they may reap the benefits of standardization at a minimum cost.

Dr. John Gaillard's book, "Industrial Standardization, Its Principles and Application," supplies this need, and such being the case, it is commended for the simplicity and thoroughness with which it deals with this important subject.

American supremacy in the commercial markets of the world has been built up on mass production, and mass production means standardization to the *n*th degree. The American Standards Association, of which Dr. Gaillard is Mechanical Engineer, is in a position where it can render invaluable aid by advising companies which contemplate standardization activities and will insure that these activities are properly tied in with the national scheme as regards existing standards and those which are contemplated in the future.

The book contains a wealth of advice and practical information for those engineers and executives who are already engaged in both company and national standardization activities. The author suggests a number of practical ways in which commercially profitable exploitation can be made on the work of a department which in many cases is regarded by company executives as a dead and purely overhead expense.

The contents of the book (123 pages) are summarized below.

EVOLUTION OF STANDARDIZATION. Types of standards. Human factors: *Leadership; The Craftsman; Craftsman-Merchant partnership.*

ESSENTIAL FUNCTIONS OF STANDARDIZATION. Progress-Time curve. When standardization can begin. Progress-Time curve of the automobile industry. Basic and other standards. Elementary and composite standards. Balance

between stabilization and coordination. Need for flexibility. Subdivision of requirements. Limit of subdivision. Lateral unification.

DEFINITION AND CHARACTERISTICS OF A STANDARD. Formulation. Definition, designation or specification. Definition of concepts in a standard. Specific requirements. Period of validity. Technical and managerial standards. Classification of concepts.

NOMINAL VALUES AND LIMITS. Interchangeability. Degree of accuracy. Selective matching. Replacement standards. Safety factor. Tolerances on limits. Use of limit systems. Maintenance of quality. Statistical method. Revised conception of a standard. Unification of standards.

DEVELOPMENT OF THE PRACTICAL APPLICATION OF STANDARDIZATION. Technical and managerial coordination. Decentralization of management. Lag of managerial coordination. F. W. Taylor's work. Situation in the United States.

STANDARDIZATION IN A MANUFACTURING CONCERN. Subdivision of coordination. Standards department. Design. Organization of design. Manufacturing. Inspection and testing. Relations of standards department. Research department. Distribution group. Purchasing department. Planning department.

ORGANIZATION OF STANDARDIZATION WORK. Company standardization. Position of standards department. Technique of standardization work. Simplification and redesign. Working plan of standards department. Where to start standardization. The four stages of standardization.

"Industrial Standardization, Its Principle and Application," has just been published by The H. W. Wilson Company, 950-72 University Avenue, New York, \$2.00; 123 pp.; cloth bound. It may be ordered from the publishers, or the American Standards Association, 29 West 39th Street, New York.

Machine Screw Group Is Associate Member

The U. S. Machine Screw Service Bureau has joined the American Standards Association as an Associate Member. The Bureau has been in touch with the work of the American Standards Association for some time, having cooperated in the work of the ASA projects on Standardization and Unification of Screw Threads, and Allowances and Tolerances for Cylindrical Parts and Limit Gages.

The Bureau is the national trade association for the machine screw industry.

¹ Formerly Chief Engineer, Cincinnati Grinders, Inc.

A Reply—Can American Industry Adopt the ISA System of Fits?¹

by

D. R. Miller

*Chief, Gage Section,
National Bureau of Standards*

Extreme Comprehensiveness

The proposed ISA system of fits provides a wide range of hole-shaft combinations to obtain a desired class of fit. For example, in the Basic Hole System, a fit with an average looseness of about 0.001 inch between parts with a nominal diameter within the range $1\frac{1}{4}$ to 2 inches, can be obtained by nine combinations, as follows:

H8-h7 (0.00125)	H7-g5 (0.00108)
H7-h6 (0.0008)	H8-h6 (0.00105)
H6-g5 (0.00088)	H8-h5 (0.00095)
H6-h8 (0.00105)	H7-h8 (0.00125)
H6-g6 (0.00098)	

(The value in parenthesis is the average looseness in inches.)

A fit with an average interference of about 0.0005 inches can be obtained in six different ways, as follows:

H8-n7 (0.00045)	H8-p6 (0.0006)
H7-n6 (0.0005)	H7-n5 (0.0004)
H6-n5 (0.0006)	H6-m7 (0.00052)

(The value in parenthesis is the average looseness in inches.)

This liberal choice raises the question as to the objective in setting up a standard of this kind. If the object is to include all product tolerances that have been specified or used, this system goes a long way toward fulfilling the objective. We believe, however, that the aim should be to recommend average limits that will give a definite class of fit under average conditions, with recommendation as to any changes in the limits required to take care of extreme variation in length of engagement, materials, running speeds, and loads.

With a single set of product tolerances for average conditions for a standard size and class of fit, small tools and gages can be standardized

¹ Abstract of comments published in *American Machinist*, August 1. The International Standards Association system of fits and its relation to the present American Standard was described by Dr. John Gaillard in the June 6 issue of *American Machinist*. Dr. Gaillard's article is abstracted in *INDUSTRIAL STANDARDIZATION AND COMMERCIAL STANDARDS MONTHLY*, July, p. 133.

and stocked. This is particularly true when the hole basis is used, as the "go" plug gage becomes a stock article, and if the product tolerance on the hole is selected so that holes produced by standard size drills and reamers fall within the limits, these tools become stock articles.

Selection of Parts

In the ISA system, the tolerances on a hole and a shaft desired to give a fit requiring selective assembly are rarely equal. This means that in selecting parts with the desired interference some of the manufactured parts cannot be used and must be worked over, or extra mating parts must be made to use up the material.

Gage Tolerance and Wear

If "go" gages are allowed to wear outside the product tolerances,² a percentage of the product intended to give a clearance fit will not go together by hand and selective assembly must be resorted to.

When a positive average clearance is desired between mating parts, why adopt a gaging system that will pass any parts that will not go together by hand? We believe that the principle that "go" gage wear should be within the product tolerances is firmly established in this country and American manufacturers will not look with favor on a deviation from this principle.

² Dr. Gaillard's article, as published in *American Machinist*, June 6, stated in part, "In the ISA system, the tolerance on the 'not go' gage is equally divided on the plus and the minus side. The tolerance on the 'go' gage lies within the limits for the product, but the gage is permitted to wear slightly past the 'go' limit." This statement and further considerations of the point concerned did not appear in the abstract of the article published in *INDUSTRIAL STANDARDIZATION AND COMMERCIAL STANDARDS MONTHLY*, July.

Similarly, giving a bilateral tolerance on "not go" gages may result in looseness exceeding the allowable looseness, for a percentage of the product.

The variation in practice with regard to direction of tolerance on "not go" gages has frequently caused considerable confusion and it is hoped that a standard of practice will be established in this country. A number of national standards have been set up specifying gages in which tolerances on the "not go" gages are within the product limits. We know of no national standard in which the tolerance on the "not go" gage is definitely outside the product tolerance.

Suggested Additions

The ISA tables do not show a standard hole or standard shaft with a tolerance between 0.0015 and 0.0063 in. for a 1½ in. size. We believe there is a demand for a standard hole, and possibly for a standard shaft, with a tolerance of approximately 0.003 in. for 1¼ in., with proportional tolerances for smaller and larger sizes.

Guidance for Manufacturer

While an experienced manufacturer can select from the ISA tables product tolerances that will give him the class of fit desired, the system in its present form does not provide any guide to the novice for selecting proper product tolerances.

Conversion of Values

In converting the ISA system to inch units, care should be taken to carry the range limits out to thousandths of an inch or possibly to ten-thousandths of an inch; otherwise product tolerances obtained from the converted table may differ from values obtained from the original table.³

Revision of B4a-1925

In our opinion all that is necessary to make the present American Standard for metal fits (B4a-1925) entirely satisfactory to American industry is to supplement it by providing for those few special cases in which two or more classes of fit are required on the same shaft. To introduce a basic shaft system in this country and give it equal status with the basic hole system will unquestionably bring confusion in manufacturing practice. The advantage of standardization of tools and gages which has developed will be destroyed. Even if the details of Standard B4a-1925 have not been universally adopted, manufacturers generally are using the basic hole system.

³Dr. Gaillard's article called attention to this point, explaining that the present values were tentatively rounded for the sake of simplicity in presentation.

Henry Ford Says:

"Henry Ford defines standardization as follows: Standardization in its true sense is the union of all the best points of commodities with all the best points of production, to the end that the best commodity may be produced in sufficient quantity and at the least cost to the consumer."—*L. E. Schumacher.*

Edmonds Represents Bolt, Nut, Rivet Makers on ASA Council

J. H. Edmonds, General Manager of the Bolt Division, Bethlehem Steel Company, Lebanon, Pa., is the representative of the American Institute of Bolt, Nut, and Rivet Manufacturers on the Standards Council of the American Standards Association. The Institute recently became a Member-Body of the ASA.

George S. Case, President, Lamson and Sessions Company, Cleveland, is alternate representative on the Council.

As members of the Standards Council, Mr. Edmonds and Mr. Case will help to make final decisions concerning standards approved by the American Standards Association.

Industry Recommends Fewer Can Sizes

A reduction in the variety of sizes of cans for fruits and vegetables has been approved by the industry, the Division of Simplified Practice, National Bureau of Standards, announced. The new range of sizes, reduced to 27, is given in Simplified Practice Recommendation R155-34.

Mimeographed copies of the Recommendation can be obtained without charge from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C., or through the ASA office.

Request International Standards for Ships

Thirty-six representatives of various European countries, attending a conference on electrical installations in ships, recently requested the presidents of the International Electrotechnical Commission and the International Standards Association to organize a Commission to consider standardization of over-load protection and rating of cables.

SYMBOLS—

the language of engineers

The American Standards Association recently approved these Graphical Symbol Standards:

Electric Power & Wiring(Z10g2-1933) 20c

Symbols for one line and complete diagrams for electric power apparatus, instruments, relays, etc., and maps and connecting diagrams. Limited to equipment in Electrical Power field.

Radio Symbols(Z10g3-1933) 20c

Fifty symbols covering tubes, transformers, condensers, inductors, and similar apparatus used in Radio work.

**Electrical Traction, incl.
Railway Signalling(Z10g5-1933) 40c**

More than 470 symbols for diagrams, limited to apparatus Power House, Substations, Transmission Systems, and Distribution Systems; Electrical Equipment of Electrical Cars and Locomotives and Railway Signalling Equipment.

Leadership in the work of correlating these Graphical Symbols was taken by the American Association for the Advancement of Science, American Institute of Electrical Engineers, American Society of Civil Engineers, and the Society for the Promotion of Engineering Education.

AMERICAN STANDARDS ASSOCIATION

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